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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,582	07/31/2003	Ilan Gavish	42P10059CD	5004

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EXAMINER

BUEKER, RICHARD R

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/632,582

Applicant(s)

GAVISH ET AL.

Examiner

Richard Bueker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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Claims 15-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The phrase "an angle of less than 90 degrees" was not contained in applicants' specification as originally filed.

Claims 12 and 17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 12 and 17 recite a program including instructions to "re-crystallize" a metal component. It is noted, however, that applicants' specification as filed described a program with instructions to crystallize by annealing, but did not describe a program to re-crystallize. The specification at paragraph 27 describes heat sources that can cause re-crystallization, but there is no description of a computer program that includes instructions to re-crystallize a metal component. It is suggested that "re-crystallize" in claim 12, line 2 be changed to "crystallize" to more accurately describe applicants' intended process.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo I (5,026,664) taken in view of Hongo II (5,182,231) and Hamamura (5,342,448). Hongo I (see Figs. 1-3B) discloses a system comprising a chamber to house a substrate with an energy source coupled to it, and means for introducing an ion beam and a metal precursor gas into the chamber for forming a metal layer on a substrate in the chamber. Hongo I also teaches the use of an argon laser beam (which is a coherent electromagnetic radiation source) for annealing the FIB-CVD metal layer (see for example, col. 2, line 56 to col. 3, line 40, of Hongo I). Regarding the claim 1 limitation reference to removing gallium, it is noted that this is a recitation of intended use that the Hongo I laser is inherently capable of performing. For example, Hongo I teaches (col. 8, lines 29-32) the use of laser power of .2 to .5 watts, while applicants teach (paragraph 28 of the specification) the use of .3 to .5 watts. Therefore, Hongo's apparatus is inherently capable of providing the same heating effects as applicants' apparatus. Hongo I does not discuss the details of the computer control system used to control his apparatus. Hongo II and Hamamura have been cited, however, to illustrate the conventional nature of using a system controller and associated programmed computer memory to control an integrated apparatus of the type disclosed by Hongo I. Hongo I teaches (col. 8, lines 1-5) the use of conventional sequence control and numerical control to control the degree of exposure of his substrate to radiation from the laser beam. Hongo II is cited to show (see Fig. 20, for example) that the conventional sequence control and numerical control referred to by Hongo I includes the use of a computer which inherently incorporates instructions as claimed. Also, Hamamura (see

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Fig. 1, for example) teaches the desirability of using computer control of an ion beam, and it would have been obvious to use computer control of the FIB CVD apparatus of Hongo II. Also, while Hongo I does not mention what kind of ion beam he uses, Hongo II (col. 6, lines 6-15) does specifically teach the use of the conventional and well known gallium ion beam for his FIB-CVD apparatus, and it would have been obvious to one skilled in the art to use the Ga ion beam suggested by Hongo II as the ion beam in Hongo I. Regarding claim 5, it is noted that Hongo I teaches the use of a lens for his laser (see Fig. 2, element 17 and col. 4, lines 15-19), and the particular lens used is a results effective variable and a matter of obvious choice for one skilled in the art. It is noted also that the claimed references to particular line widths and spot sizes are method type limitations that do not so limit the present apparatus claims. The apparatus of Hongo I, Hongo II and Hamamura have an inherent or at least obvious capability of being so used. Regarding the limitation of "an angle of less than 90 degrees" recited in claims 15-21, it is noted that this includes a laser beam having any possible slight deviation from 90°. Regarding claim 12, it is noted that Hongo's system is used (see col. 8, lines 6-9) to introduce plural metal precursor gases through plural inlets. Regarding claim 9, see Hongo I at col. 8, lines 32-37.

Claims 12 and 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo I (5,026,664) taken in view of Hongo II (5,182,231) and Hamamura (5,342,448) for the reasons stated in the previous paragraph rejection, and taken in further view of Azuma (5,683,547). Azuma discloses an analogous apparatus to that of Hongo I, Hongo II and Hamamura in which an integrated processing apparatus is

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provided for integrating FIB processing with laser processing. Azuma further teaches the desirability of processing substrates in which the top surface of a layer to be processed forms an angle to the direction of the laser beam that is directed to said top surface. See, for example, figs. 25a-25f. It would have been obvious to one skilled in the art to integrate the functions of Azuma's integrated processing apparatus with the integrated processing apparatus of Hongo I, Hongo II and Hamamura, for the desirable purpose of providing a versatile integrated processing apparatus that is capable of performing all of the processing steps desired by Hongo I, Hongo II, Hamamura and Azuma.

Claims 16 and 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo I (5,026,664) taken in view of Hongo II (5,182,231), Hamamura (5,342,448) and Azuma (5,683,547) for the reasons stated in the previous paragraph, and taken in further view of Marsh (6,261,850). Claims 16 and 18-21 make reference to a width of a layer. First, it is noted that the width of a layer that could be deposited by an apparatus is in the nature of a method limitation and does not so limit the presently claimed apparatus. Regarding the question of what width of layer applicants' FIB CVD apparatus is inherently capable of forming, it is noted that applicants disclose (see paragraph 23 of applicants' specification) that their FIB is a commercially available model, which is the same model as used by Marsh (col. 9, lines 15-19). It would have been obvious to one skilled in the art to use the commercially available Ga FIB CVD source of Marsh as the Ga FIB CVD source suggested by Hongo II, because Marsh teaches that his source can successfully be used to practice a FIB CVD process. In

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such case the FIB would have been expected to be inherently capable of providing the line width referred to in claims 16 and 18-21.

Claims 1-21 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Gavish (6,638,580). The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131. Gavish (6,638,580) discloses a system including a chamber, energy source, ion beam source, system controller and memory coupled to the controller as presently claimed. The memory has a computer-readable program embodied therein for directing operation of the system, the program comprising instructions for controlling the energy source and for introducing at least one metal containing precursor into the focused ion beam to form at least one layer over the substrate.

Applicants' arguments presented in their response filed January 18, 2005, have been considered but are not germane to the new grounds of rejection stated above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parvis Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard J. Bueker
Richard Bueker
Primary Examiner
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